

REMARKS

This invention relates generally to smectic liquid-crystal displays. Specifically, the invention of the current application provides a suitable chiral smectic liquid crystal mixture and a switching and display device comprising the suitable chiral smectic liquid-crystal mixture, where the liquid-crystal mixture makes it possible, owing to its excellent alignment properties and specified favorable alignment angles, to achieve a very high contrast over a broad temperature range.

Pursuant to 37 C.F.R. § 1.136(a), Applicants respectfully petition the Assistant Commissioner for patents to extend the time period for responding to the outstanding Office Action by one (1) month, up to and including February 9, 2004 because February 7, 2004 was a Saturday. A check for \$110.00 to cover the petition fee is enclosed herewith. Should any additional fee be required for the consideration of this Response, the Assistant Commissioner is authorized to charge such fee, or credit any overpayment, against Deposit Account No. 50-0320.

Claims 12-19 are pending.

In response to the Restriction Requirement, Applicants elect the Group I, claims 1-18, drawn to a liquid crystal display device. This election is made with *traverse* and is made without prejudice to Applicant's right to file a divisional applications directed to the non-elected subject matter. It is respectfully requested that the restriction requirement be favorably reconsidered and withdrawn.

Applicants respectfully urge that the Restriction Requirement is not proper as there is a single inventive concept under PCT Rule 13.1. Furthermore, it is argued that the Requirement is improper under U.S. practice because it does not establish that searching all the inventions would constitute an undue burden to the Patent Office and is contrary to public policy. Accordingly,

Applicants submit that the Restriction Requirement is improper and should be withdrawn. With respect to PCT Rule 13.2, which noted that the International Examination Report held that there was unity of invention, please note that claim 19 in the U.S. application corresponds to claim 9 in the international application. As the International Bureau has held that there is unity of invention, it is argued that the USPTO cannot modify this in the National Stage.

With respect to the U.S. National Rules, which should not govern in this circumstance, it is urged that the requirement would still be found to be improper. The MPEP lists two criteria for a proper restriction requirement. First, the invention must be independent or distinct. MPEP § 803. Second, searching the additional invention must constitute an undue burden on the examiner if restriction is not required. *Id.* The MPEP directs the examiner to search and examine an entire application “[i]f the search and examination of an entire application can be made without serious burden, ... even though it includes claims to distinct or independent inventions.” *Id.*

Applicants urge that the Restriction Requirement does not meet the second of these criteria as the search for the groups overlap. For example, because chiral smectic liquid crystal mixture is an essential component of liquid crystal display device, Applicants urge that Group I, drawn to liquid crystal mixture, and Group II, drawn to chiral smectic liquid crystal mixture, overlap and should be examined together.

Further, it is respectfully urged that restricting the claims in the manner suggested in the Restriction Requirement constitutes an undue burden to Applicants as well as to the public. The cost of prosecuting and maintaining so many patents is unreasonable in view of the fact that the two groups are so closely related. Further, the public is inconvenienced, as they will not know whether or not Applicants will file a divisional application to the remaining subject matter.

Accordingly, the public will not know if they can practice the remaining invention without infringing future patent applications.

Accordingly, in view of the foregoing, reconsideration and withdrawal of the restriction requirement are requested.

Claims 12 and 16 stand rejected under 35 U.S.C. 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Applicants urge that Amendment to claims 12 and 16 render the rejection moot. Please note that the definitions of Tc and Tni are well known to one skilled in the art and that the dictionary definitions of these terms may be provided upon request. Also the definition of the term Tc is described on the page 8 of the specification. Thus, no new matter had been added.

Claims 12-15 stand rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over Mori et al. (U.S. 5, 629, 788, "Mori"), in view of Takatori et al. (U.S. 6, 351, 301) and Applicant's Admission of Prior Art (AAPA) and claims 16-18 stand rejected as being allegedly unpatentable over Mori, Takatori and AAPA in view of Fuss et al. (U.S. 5, 547, 605, "Fuss").

As none of these publications or alleged Applicant's Admission of Prior Art disclosed monostable liquid crystal mixture with specific favorable alignment angles which ensures a very high contrast over a broad temperature range, Applicants urge that the rejection does not establish a *prima facie* case of obviousness. Also, the Examiner is respectfully reminded that for the Section 103 rejection to be proper, both the suggestion of the claimed invention and the expectation of success must be founded in the prior art, and not Applicants' disclosure. *In re Dow*, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988).

The rejection relies upon the teaching of Mori, which does not relate to an asymmetric mono-stable chiral-smectic liquid crystal mixture. This is in contrast to the instant invention which discloses an asymmetric mono-stable liquid crystal mixture which is achieved as a result of angle ratio (Δ/Θ) values being larger than 0.

In the present invention, the angle Δ (see Figure 1 in the Examples) lies within the layer of the electrode layer if the rubbing direction lies in this layer as well. It is exactly the angle by which the symmetry known from the bistable FLC-displays is broken, i.e. the angle between the projection of the smecting layer normal 2 and the rubbing direction 1. The layers thus are also inclined, but not relative to the “vertical” field direction, but relative to the “horizontal” rubbing direction.

Furthermore, as described above, the angle relationship in Mori that is compatible with the Δ/Θ angle relationship of the present invention, is always exactly 0, i.e. the projections of the layer normal is exactly in rubbing direction, and the bistable states are symmetrically positioned on the left hand side and right hand side thereof. This is very different from the present invention wherein the ratio Δ/Θ is at least 0.41, i.e. the layer normal includes to one side by at least 0.41 times the tilt angle. Therefore, the direction configuration of the present invention is strongly asymmetric. It is because of these breaking of the symmetry that the liquid-crystal device of the present invention is able to achieve a monostable orientation (see page 12, second paragraph of the specification). Moreover, the monostable orientation of the present invention ensures that the memory-function is lost, but a continuous gray scale is obtained. The only stable state (projection of the director) is now in the rubbing direction.

Furthermore, the angle relations of δ/Θ of Mori have specific definitions which are very different from the angle relations of Δ/Θ according to the present invention. In Mori, δ defines the "layer leaning angle". This angle is defined as the angle between the smectic layer and the normal of the electrode plate (see Figures 3A and 3B). When looking through a FLC cell from below to above, i.e., in the field direction from electrode to the other electrode, the layer normals are not parallel to this view direction, but slightly inclined and not exactly vertical. Typical relations of δ/Θ are from 0.7 to 1.0.

Finally, Mori describes a transition which is symmetrical to a change of the polarity. In contrast, the transmission of present invention is asymmetrical to a change of polarity. As a result, there are no two bright states, but only one stable dark state and a continuum of bright states, allowing to adjust the brightness or transmission continuously. This leads to a very high contrast over a broad temperature range, since a very low dark transmission of the LCD-cell is achieved to the excellent orientational properties (see specification, page 3, line 18 and 31).

Neither Takatori nor the alleged AAPA, which discloses a nonstructured substrate combined with an active matrix substrate (see page 1, lines 20-23), remedy the above described deficiencies in Mori. Takatori relates to a smectic liquid-crystal which enables gray scale display and a liquid crystal using the same, see column 1, lines 5- to 12. The ferroelectric liquid-crystal display employs a mono-stable FLC having a half V-shaped switching mode. This mono-stable FLC having a half -shaped switching mode has the correspondence in which brightness is changed only by one polarity of a voltage.

However, no where does Takatori mentions of the specific excellent alignment properties favorable alignment angles which ensure high contrast over a broad temperature range as described in the present invention. Moreover, in contrast to the present invention which teaches

only one stable dark state and a continuum of bright states, Takatori teaches only on bright state and accordingly, the maximum transmission is twice as high compared to the instant invention.

Accordingly, Takatori does not provide the requisite suggestion or motivation that would lead one of ordinary skill in the art to combine the teachings of Mori and AAPP with Takatori in order to practice the instantly claimed invention.

The Examiner further rejects claims 16-18 as allegedly being obvious over Mori, Takatori, AAPA in view of Fuss. As described above, Applicants urge that Mori, Takatori and AAPA do not suggest the claimed liquid-crystal mixtures or liquid crystal displays according to the present invention and thus does not establish a *prima facie* case of obviousness.

Fuss does not remedy the inherent deficiencies of Mori, Takatori and AAPA as it relates to 2-aryloxytetrafluoropropionic esters, the process of their preparation and their use in liquid-crystalline mixtures. There is no requisite suggestion or motivation in Fuss that would allow one skilled in the art to practice the claimed chiral smectic liquid-crystal mixture in mono-stable alignments having the specific angle relationships which ensure high contrast over a broad temperature range as described in the present invention.

Thus, in view of the foregoing, it is urged that none of the prior publications, taken alone or in any fair combination suggest the present invention. None of the prior publications relied upon in rejection discloses the specific liquid crystal switching or display device of the instantly claimed invention. The instant invention, as claimed, discloses a specific liquid crystal switching or display mixture in a mono-stable alignment having a specific angle relationship. As discussed above, none of the prior publications taken in any fair combination suggest these claim elements. Thus, the rejection cannot establish a *prima facie* case of obviousness. Further evidence of nonobviousness is the fact that the numerous advantages corresponding to the inventive liquid-

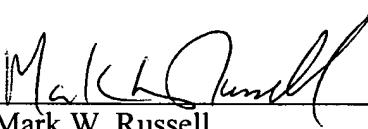
crystal switching device (see page 3, last two paragraphs) are obtained by these claim elements and are not suggested in these prior publications. Accordingly, it is urged that the rejection does not establish a *prima facie* case of obviousness and withdrawal of this rejection is requested.

Favorable action is earnestly solicited.

Respectfully submitted,

FROMMER LAWRENCE & HAUG LLP
Attorneys for Applicants

By:


Mark W. Russell
Reg. No. 37,514
(212) 588-0800